



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/NO00/00089</p> <p>(22) International Filing Date: 15 March 2000 (15.03.00)</p> <p>(30) Priority Data: 1999 1359 19 March 1999 (19.03.99) NO</p> <p>(71) Applicant (for all designated States except US): MEDICAL COMPLIANCE SYSTEMS AS [NO/NO]; Inkognitogt. 1, N-0258 Oslo (NO).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): ABRY, Emil [NO/NO]; Hoslekroken 10, N-1347 Hosle (NO). HAGEN, Lars [NO/NO]; Skjoldveien 22a, N-0881 Oslo (NO).</p> <p>(74) Agent: PROTECTOR INTELLECTUAL PROPERTY CONSULTANTS AS; P.O. Box 5074 Majorstua, N-0301 Oslo (NO).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p>
<p>(54) Title: PILL DISPENSER</p> <p>(57) Abstract</p> <p>A pill dispenser (1) including a clock element (2) and a pill-dispensing element (3) is described, which clock element (2) includes: a programmable clock connected to one or more signal transmitters and one or more acknowledgement or reset switches (5) for resetting the signal, a memory module for registration of signals from the acknowledgement or reset switches (5); which pill-dispensing element (3) includes: one or more pill receptacles (6), each including dispensing means for dispensing of pills. The dispensing means of the pill receptacles (6) include an insert (11) shaped to prevent more than one pill being dispensed at a time, and a sliding damper (18) which may be moved manually or automatically between a closed position in which dispensing of the pill (25) is prevented, and an open position, in which the pill (25) is dispensed.</p> <div data-bbox="720 1513 1703 2113"></div>		

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## Pill dispenser

The present invention regards a pill dispenser as described in the introduction to Claim 1.

It has long been a problem that patients who use medicines that are to be taken at  
5 specific times of the day, either forget to take the medicine at the right time, or take the  
medicine at the wrong time. This may cause the medication not to have the desired  
effect, or, at worst, to have a detrimental effect.

A device has previously been described for dosing of pills and medicines, which  
10 consists of a box partitioned into several compartments, where each compartment may  
contain pills to be taken e.g. morning, noon and night.

An object of the present invention is to notify the patient when he or she should take  
pills.

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Another object of the present invention is to enable a doctor or other medical personnel  
to check whether the patient has been taking the pills at the right times.

A further object of the invention is to prevent any addicts from taking several pills at the  
20 same time or more frequently than prescribed by the doctor.

These and other objects are achieved by a pill dispenser characterised in that it includes  
a clock element and a pill-dispensing element,

which clock element includes:

25 a programmable clock connected to one or more signal transmitters and one or more  
acknowledgement or reset switches for resetting the signal,  
a memory module for registering the signals from the acknowledgement or reset  
switches (5);

which pill-dispensing element includes:

30 one or several pill receptacles, each including dispensing means for dispensing of pills.

The dispensing means of the pill receptacle include an insert designed to prevent more than one pill being dispensed at a time, and a sliding damper that may be moved manually or automatically between a closed position, in which dispensing of the pill is prevented, and an open position, in which the pill is dispensed.

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In the following, the invention will be explained in greater detail through examples of embodiments, with reference to the accompanying drawings.

Figure 1 shows a first embodiment of the pill dispenser in accordance with the present invention, with one pill receptacle.

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Figure 2 shows the embodiment in Figure 1, with three pill receptacles.

Figure 3 shows the embodiment in Figure 1 in a non-assembled state.

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Figure 4 shows the annular wall of the pill receptacle, seen in perspective from the front and the back, and from above, respectively.

Figure 5 shows an insert in the pill receptacle, seen in perspective from the front and the back, and from above, respectively.

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Figure 6 shows the sliding damper of the pill receptacle, seen in perspective from the front and the back, and from above, respectively.

Figure 7 shows the components shown in Figures 4-6 in an assembled state.

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Figure 8 shows the functioning of the pill dispenser.

Figure 9 shows a version of the dispenser means in accordance with the invention.

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Figures 1-7 show an embodiment of the pill dispenser in accordance with the present invention.

The pill dispenser 1 consists of two main parts, a clock element 2 and a pill-dispensing element 3. In Figure 1, the pill dispenser is shown with only one pill-dispensing element, while Figure 2 shows a pill dispenser 1 with a total of three pill-dispensing elements 3.

The clock element 2 consists of an electronic, programmable clock with a display 4 that may for instance show the time and possibly one or more messages. The clock element 2 is also provided with means for giving off alarms in the form of e.g. lights, sounds and/or vibrations. As an option, the user may choose between the types of alarm to be given off. Further, the clock element 2 is programmable, e.g. by use of a computer, such that the alarm times may be set. An alarm may also be given off when one or more pill-dispensing elements are empty.

The purpose of the clock element 2 is to give the user a signal to indicate that it is time to take one or more pills. At the same time, the clock element 2 can contain a device that registers whether or not the pill or pills have been dispensed, and this information may later be read, either off the display 4 or by connecting the clock element 2 to a computer. The clock element 2 may be provided with one or more buttons 5 which the patient pushes to reset the alarm, and which may give the memory in the clock element a signal that the pill or pills have been dispensed. The purpose of this is to enable for instance a doctor or a pharmacy to read whether the patient has taken the pill or pills at the right time, when the patient comes in for a check-up or gets a new portion of pills.

The clock element 2 may for instance be provided with a removable lid that covers setting switches for manual setting of the alarm times and/or terminals for connecting the clock element to a computer, in such a manner that the information in the clock element may be read and the alarm times may be set.

The pill-dispensing element 3 consists chiefly of a pill receptacle 6 with dispensing means. The pill-dispensing element 3 may consist of one or more pill receptacles 6 arranged underneath each other, if the patient is to take several different pills at different

times. The pill receptacles 6 may for instance be removably attached to each other by a bayonet coupling or similar.

Figure 3 shows the pill dispenser in Figure 1 in a non-assembled state. In the  
5 embodiment shown, the pill dispenser consists of the clock element 2, an insert 11,  
which is arranged in a pill receptacle 6 together with a sliding damper 18. On the  
underside of the pill receptacle 6 there is a fixed bottom or a removable lid 26. The  
functions and the mutual positioning of these components will be described later.

10 Initially, the various components of the pill-dispensing element will be described  
separately with reference to Figures 3-6, and then the mutual assembly of the  
components will be explained with reference to Figures 7-9.

In the embodiment shown in Figures 1-9, the pill-dispensing element 3 and the clock  
15 element 2 are shown with a circular cross section, however it is obvious that the pill-  
dispensing element 3 and the clock element 2 may have any other form of cross section,  
such as oval, rectangular, square etc.

As shown, the pill-dispensing element consists of a pill receptacle 6 consisting of a top  
20 and a bottom (not shown) and a peripheral wall 7 (Figure 4). In the embodiment shown,  
this peripheral wall 7 is annular and has an opening 8. Within the peripheral wall 7 is  
arranged an inner wall 9 that extends across a portion of the length of the peripheral  
wall 7. An elongated slot 10 is formed between the peripheral wall 7 and the inner wall  
9. The shape and dimension of the opening 8 will be matched to the shape and  
25 dimensions of the pills to be dispensed. A through slot 27 runs through a portion of the  
peripheral wall 7 located outside the elongated slot 10. The purpose of this slot will be  
explained later.

Figure 5 shows an insert 11 consisting of a funnel-shaped element 12 with an aperture  
30 13. The shape and dimensions of the aperture 13 will be matched to the shape and size  
of the pills to be dispensed. Further, the insert 11 is provided with arm elements 14, 15  
that extend from the widest part of the funnel-shaped element 12 and arm elements 16,

17 that extend from the narrowest part of the funnel-shaped element 12. The height of the insert 11 is approximately equal to the height of the peripheral wall 7.

In Figure 6 is shown a sliding damper 18 consisting of a wall 19, which in the embodiment shown is in the form of a segment of a circle, and which at the end is provided with a lug 20 that for part of its length is connected to the wall 19 by a middle piece 21, in a manner such that the lug 20, the middle piece 21 and the wall 19 will have an H-shaped cross section as shown in Figure 5a. Near the other end of the wall 19 is formed an enlargement 22, a section of which is provided with a through hole 23.

10

In Figure 7, the components are shown in an assembled state (without clock element or bottom), seen in perspective from the front, the back and above respectively.

The insert 11 is positioned in the pill receptacle 6 in such a way that the aperture 13 in the funnel-shaped element 12 is staggered relative to the opening 8 in the peripheral wall 9 of the pill receptacle 6. The end of the arm elements 14-17 abuts the inside of the peripheral wall 9 and is attached to this at one or more points. The sliding damper 18 is arranged in such a way that the wall 19 of the sliding damper 18 lies slideably in the elongated slot 10 between the peripheral wall 7 and the inside wall 9 of the pill receptacle 6. The middle piece 21 between the lug 20 and the wall 19 will be slideably arranged in the slot 27 in the peripheral wall 7 of the insert 11.

20

Figures 8a-c shows a simplified version of the workings of the pill dispenser when a pill is to be dispensed.

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As shown in Figure 8a, when the device is in the closed position, the hole 23 in the sliding damper 18 will coincide with the aperture 13 in the funnel-shaped element 12. In this position, a pill 25 positioned inside the pill receptacle 6 will be able to move freely through the aperture 13 in the insert and into the hole 23 in the sliding damper 18. The pill 25 will then be prevented from falling out by the hole 23 in the sliding damper 18 being covered by the peripheral wall 7 on the outside. By pushing the lug 20 in the downward direction (in Figure 8b), the pill 25 will be passed to the left in the Figure,

30



that is towards the opening 8 in the pill receptacle 6. In Figure 8c, the device is shown in the dispensing position, as the sliding damper 18 is pushed far enough to the left to make the aperture 13 in the sliding damper 18 coincide with the opening 8 in the pill receptacle 6. The pill 25 will then fall out of the pill receptacle 6, while other pills are prevented from falling out at the same time, by the enlargement 22 on the sliding damper 18 covering up the aperture 13 in the insert. After the pill 25 has been removed, the sliding damper is brought back to the position shown in Figure 8c. This return motion may take place through use of a spring-loaded device (not shown) that biases the sliding damper counter-clockwise in the Figure.

10.

The above-described embodiment of the pill dispenser in accordance with the present invention may be modified and developed in a variety of ways.

As mentioned earlier, the pill dispenser may comprise more than one pill receptacle, by each pill receptacle being connected to each other by for instance a bayonet coupling or similar. The pill dispenser may thus be used to dispense several different types of pills at different times. In this case, the display 4 may be designed to give off a signal to indicate which pill receptacle should be opened, for instance by specifying a colour code that corresponds to the colour of the relevant pill receptacle or the lug 20 of the pill receptacle.

As a replacement for or a supplement to the acknowledgement/reset button(s) 5 on the clock element 2, each pill receptacle 6 may be equipped with a device that transmits a signal to the clock element when a pill is dispensed. This signal may then be stored in the memory of the clock element, in such a way that e.g. a doctor may register whether the patient has taken the pills at the correct times, either by connecting the pill dispenser up to a computer, or by reading it directly off the display 4.

In order to prevent abuse of pills, it is possible to provide each pill receptacle with a locking device that releases the sliding damper only when the locking device receives a signal from the clock element. Further, the pill receptacle may be designed in such a



way that it can only be opened by authorised personnel, for instance by using a suitable locking device.

The pills 25 may either be loose in the pill receptacle, or they may be arranged in a so-called blister package or strip. In this case, the pill receptacle may be provided with a  
5 suitable feeder, so that only one pill is dispensed at a time. This feeder may for instance be electromechanical.

In order to be suitable for pills of different shapes and sizes, the shape of the holes 8, 13  
10 and 23 may be changed. Figure 9 illustrates an example of dispensing of an oblong capsule. Here, both the funnel-shaped part 12 of the insert, the aperture 13 in the sliding damper 18 and the opening 8 in the pill receptacle are adapted to the dimensions of the capsule.

15 As a further modification of the pill dispenser, pills that have a shape that makes them difficult to dispense in the above-mentioned manner may for instance be disposed in a spring-loaded magazine in the pill receptacle. The pills may thereby be pushed out one by one by the spring tension.

20 The invention also includes those variants of the pill dispenser that are without a clock element and/or a memory module.

## Claims

1.

- Pill dispenser (1), c h a r a c t e r i s e d i n t h a t i t  
5 comprise, in combination, a clock element (2) that is known per se and a pill-dispensing  
element (3) that is known per se,  
which clock element (2) includes:  
a programmable clock connected to one or more signal transmitters and one or more  
acknowledgement or reset switches (5) for resetting the signal,  
10 a memory module for registration of signals from the acknowledgement or reset  
switches  
(5);  
which pill-dispensing element (3) includes:  
one or more pill receptacles (6), each including dispensing means for dispensing of  
15 pills, and wherein  
the dispensing means of the pill receptacle (6) include an insert (11) shaped to prevent  
more than one pill being dispensed at a time, and a sliding damper (18) which may be  
moved manually or automatically between a closed position in which dispensing of the  
pill (25) is prevented, and an open position in which the pill (25) is dispensed.

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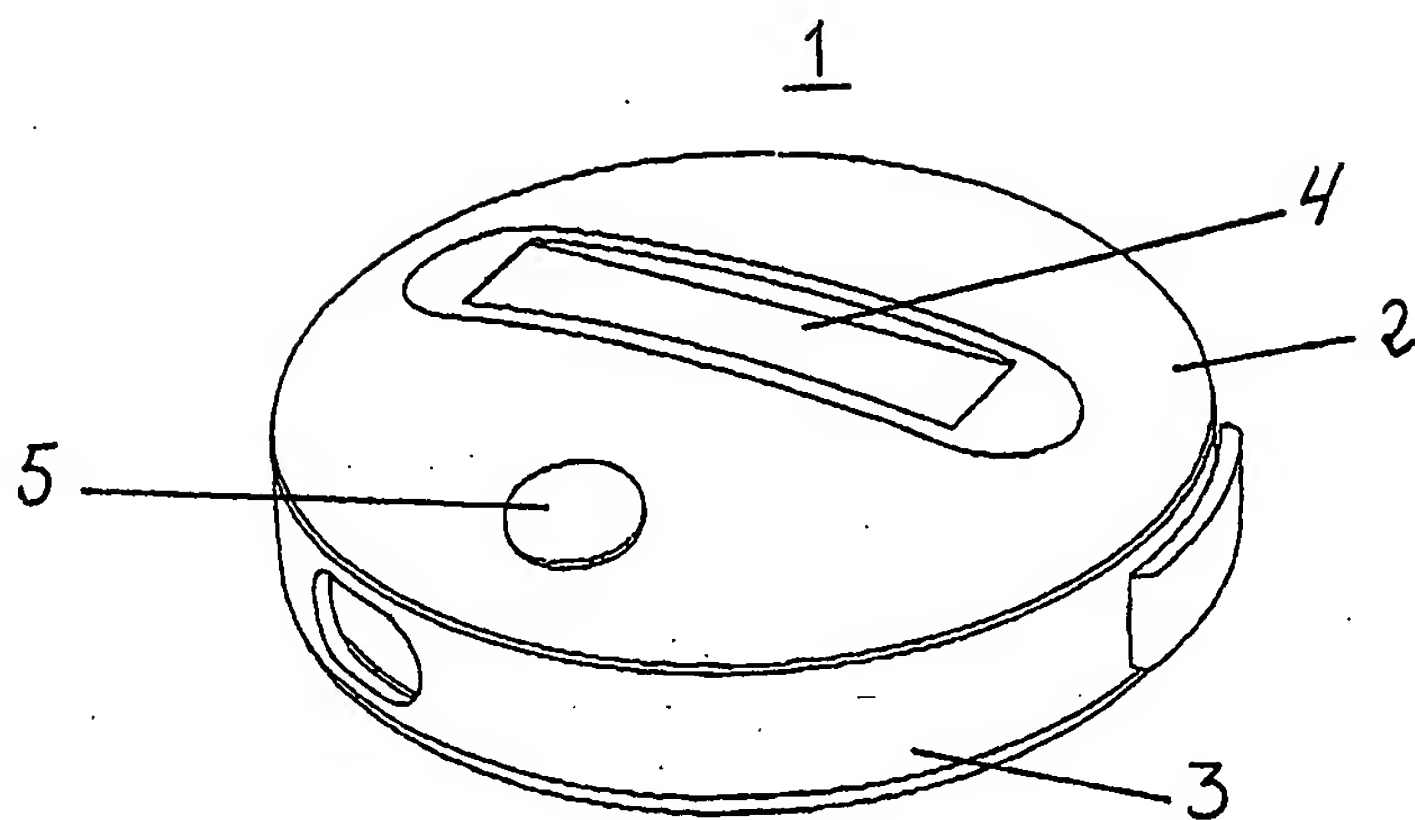


Fig. 1

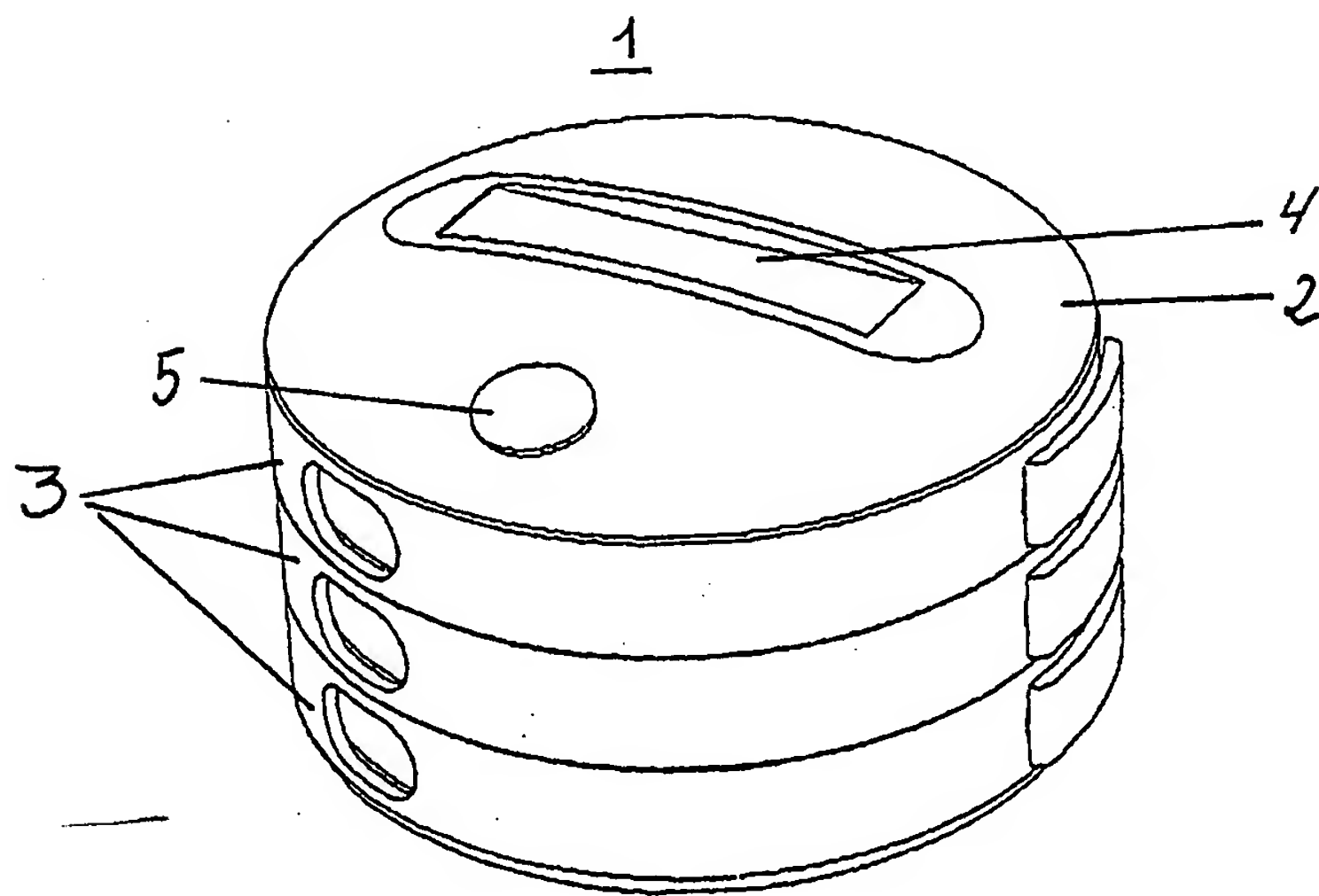


Fig. 2

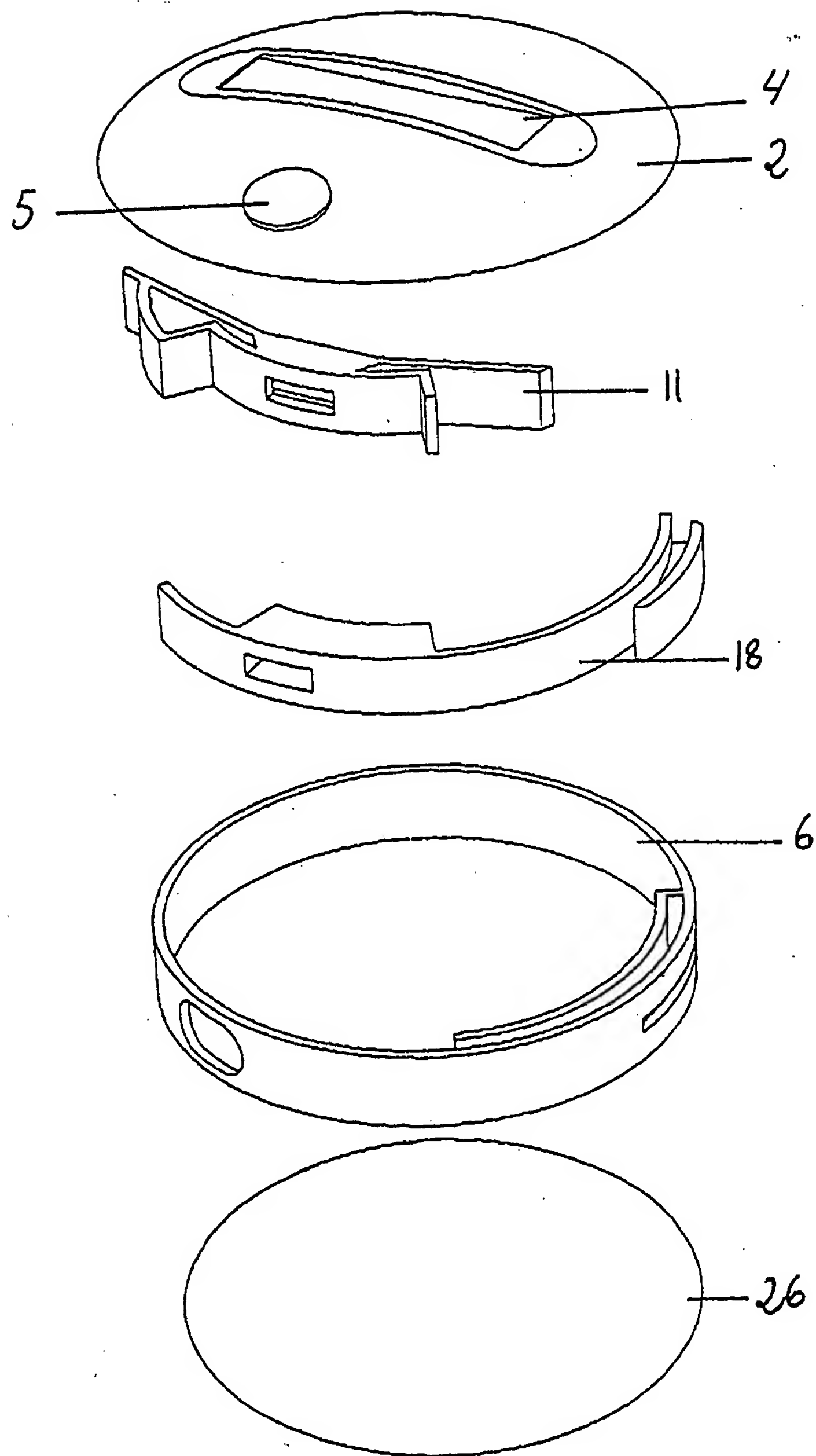
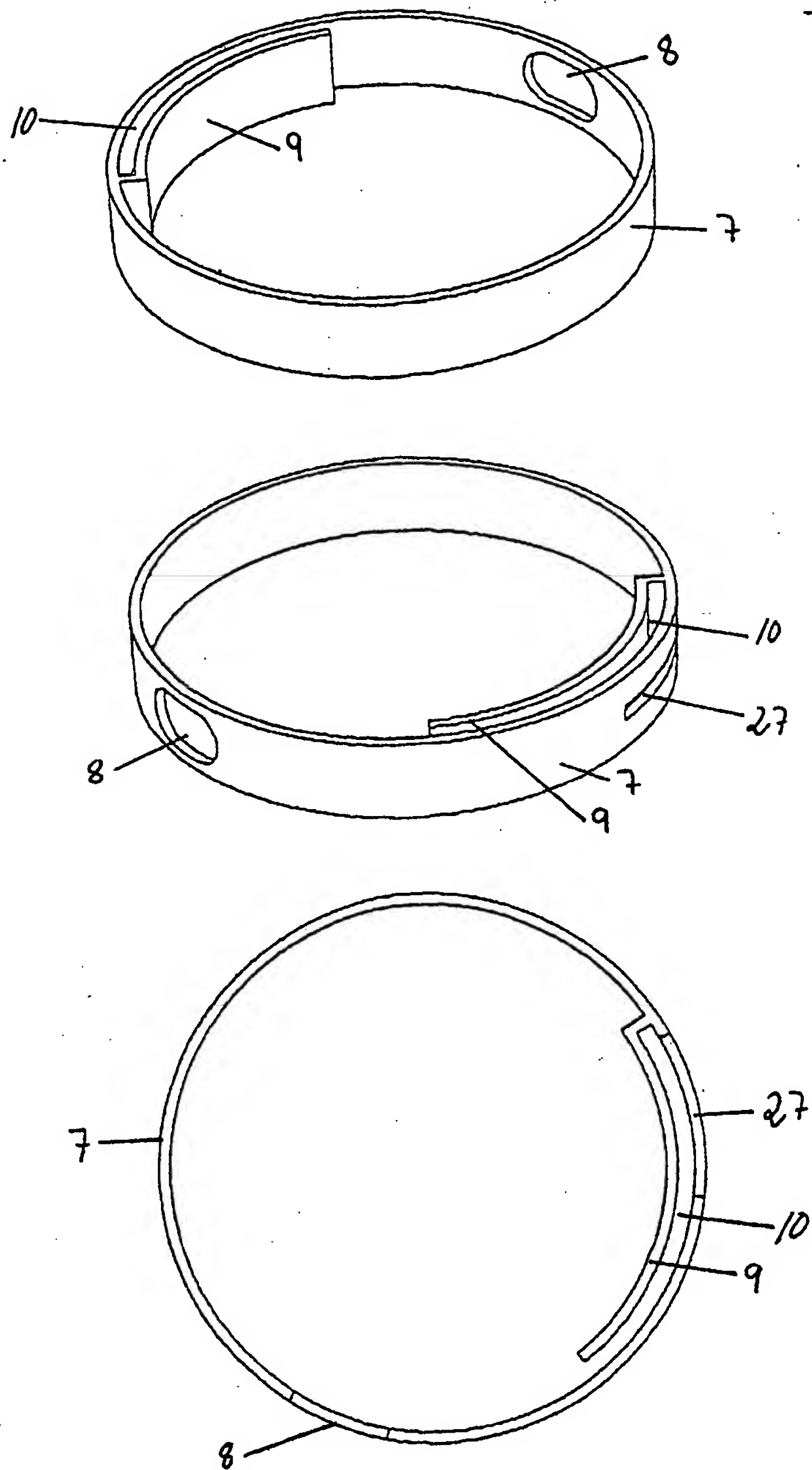


Fig. 3

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6



**Fig. 4**

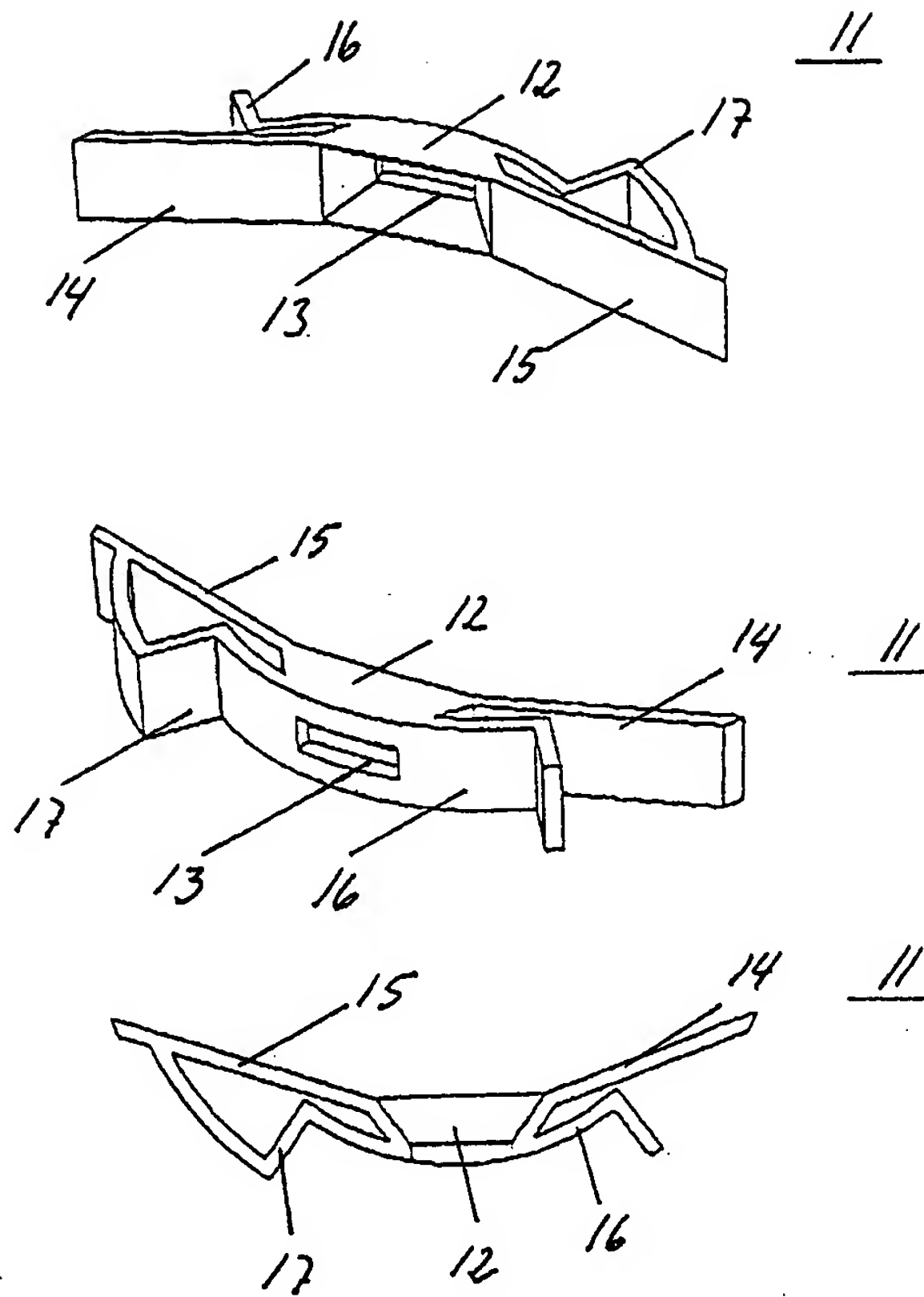


Fig. 5

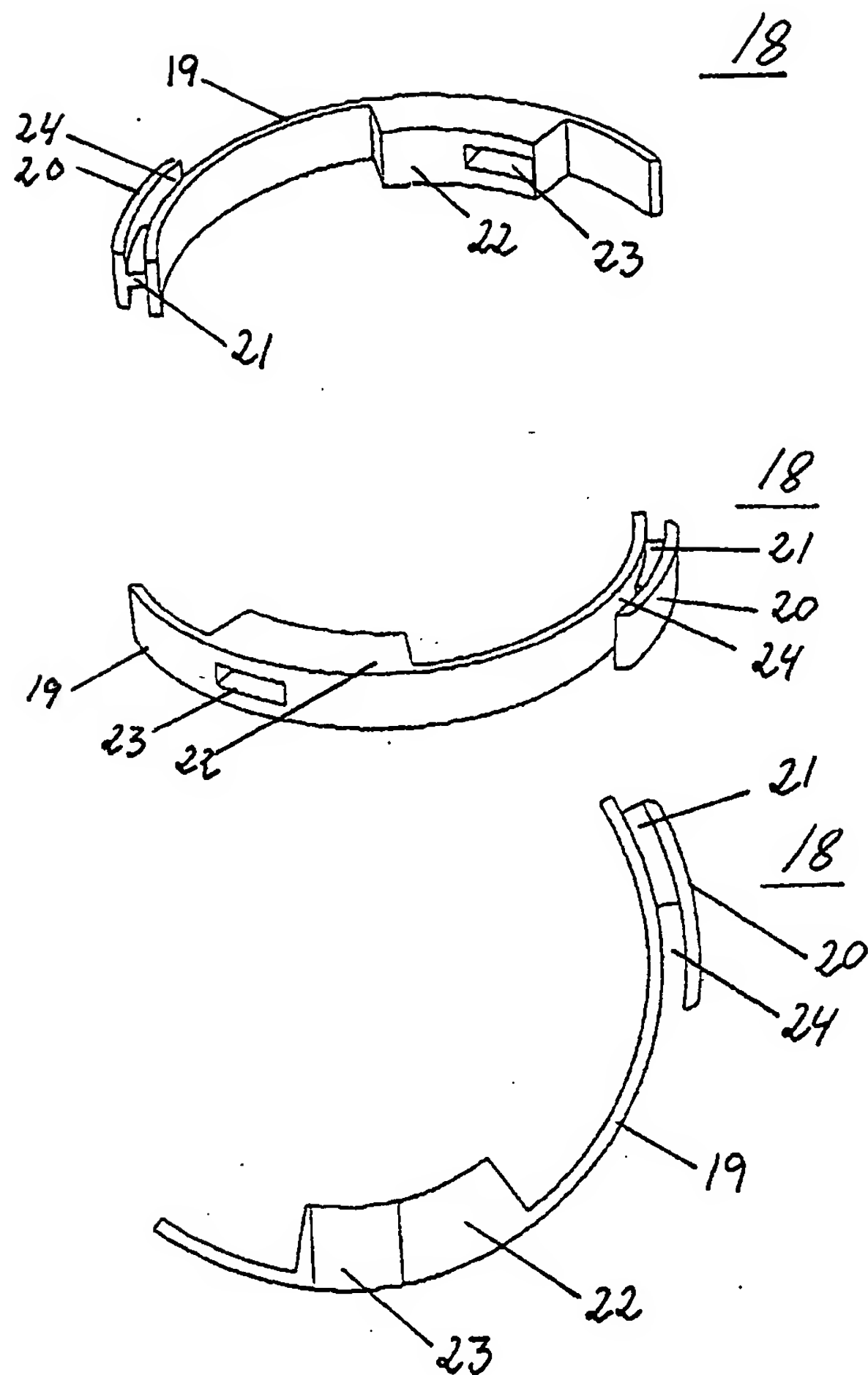


Fig. 6



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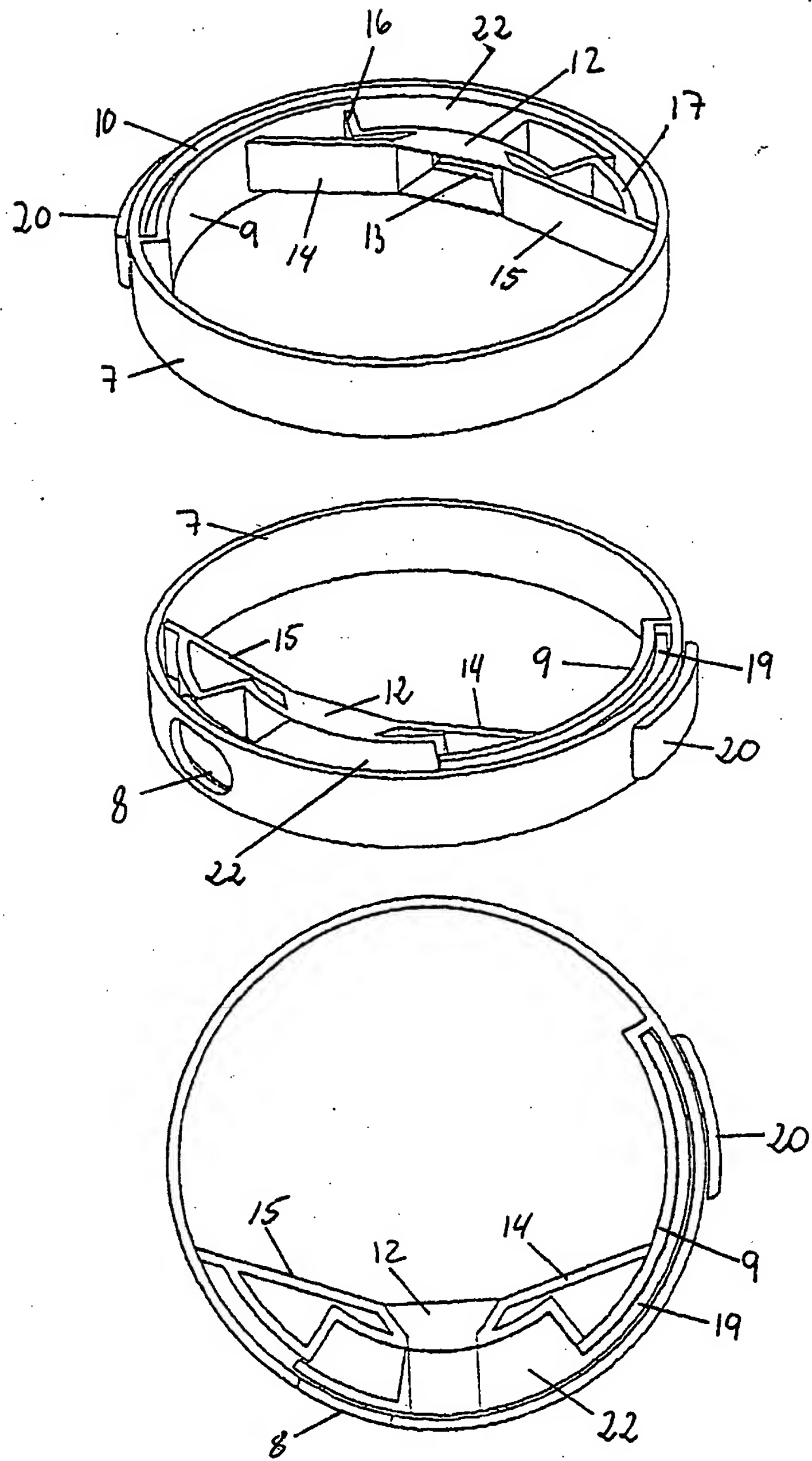


Fig. 7

Fig. 8a

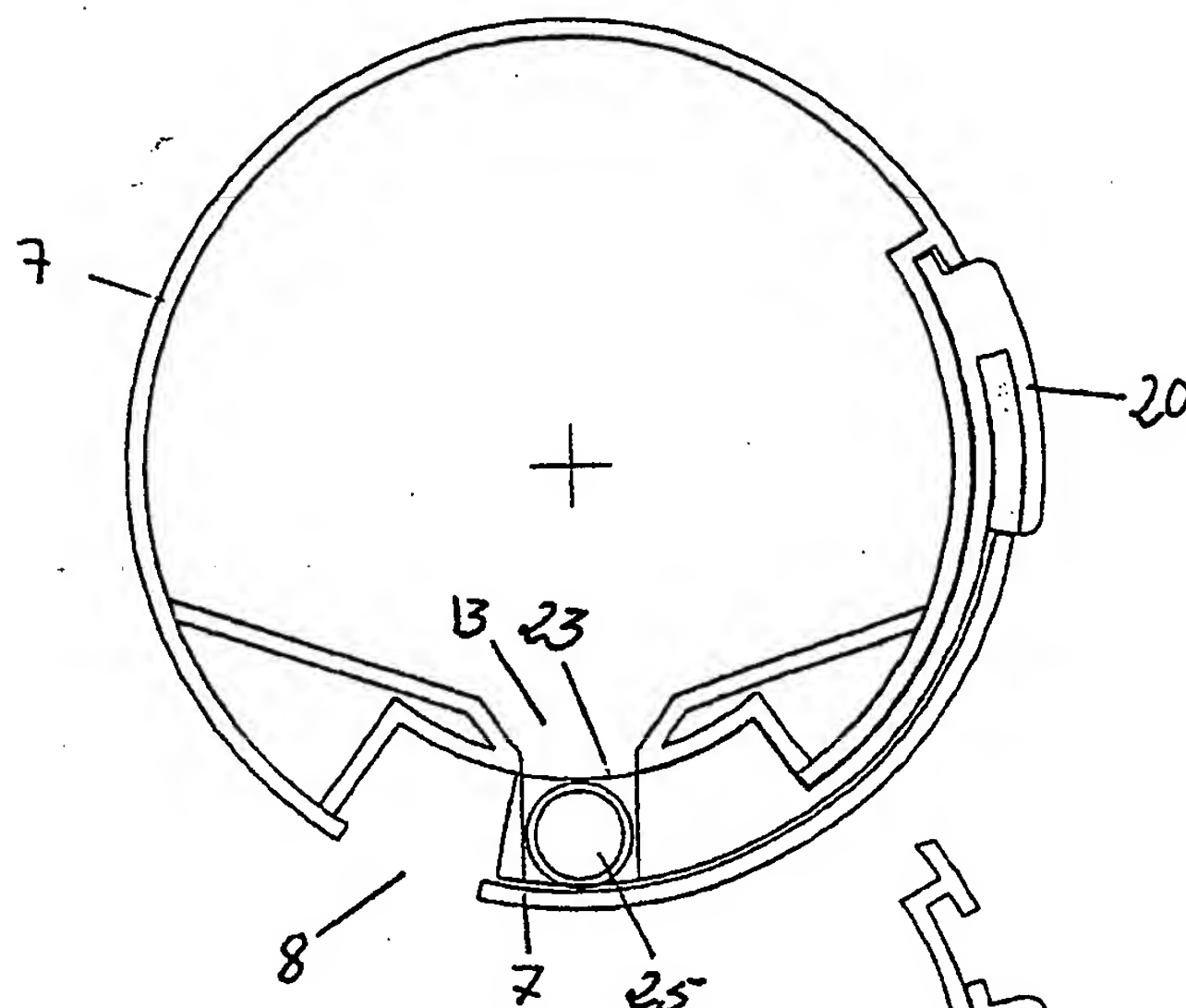


Fig. 8b

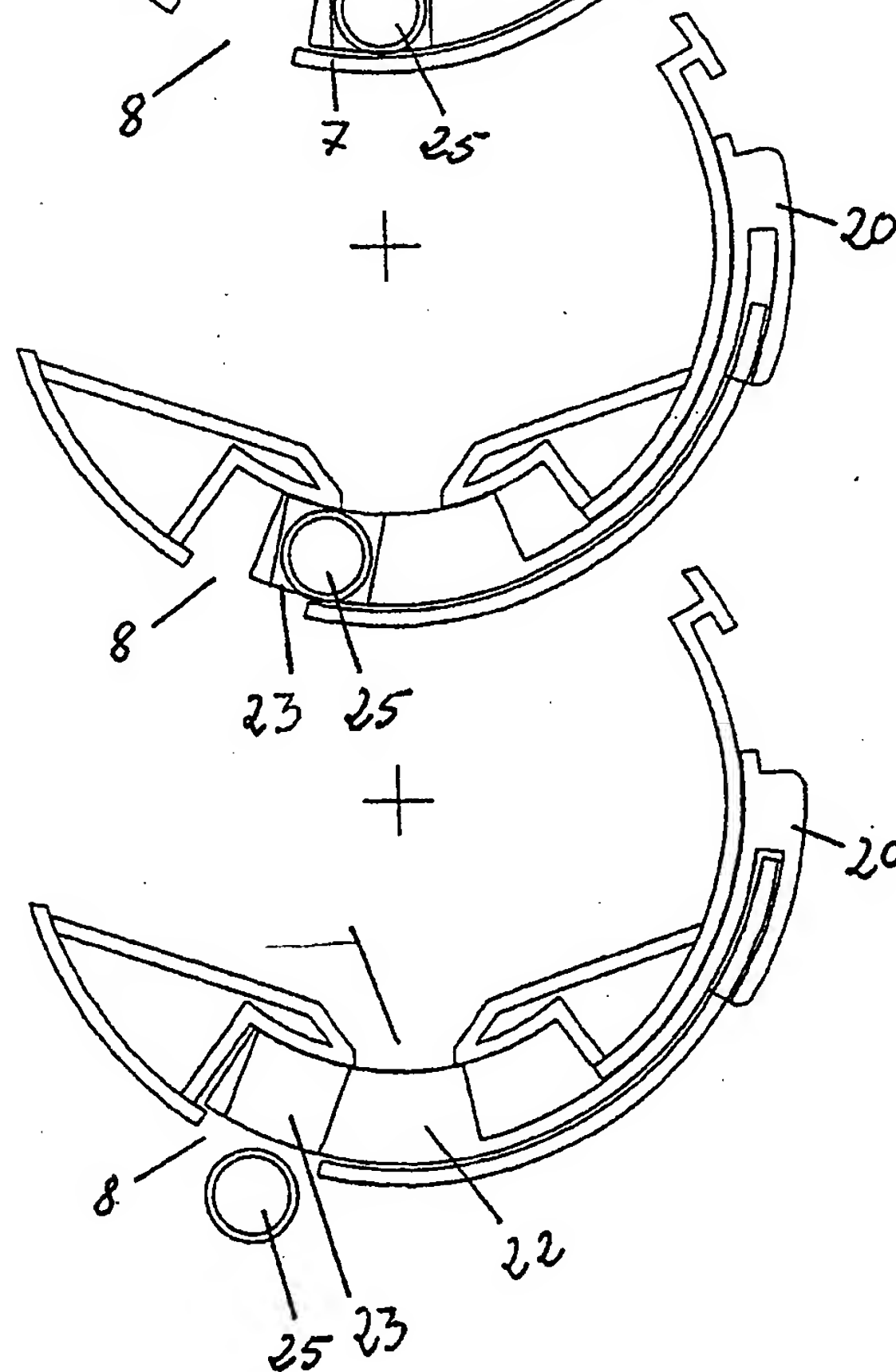


Fig. 8c

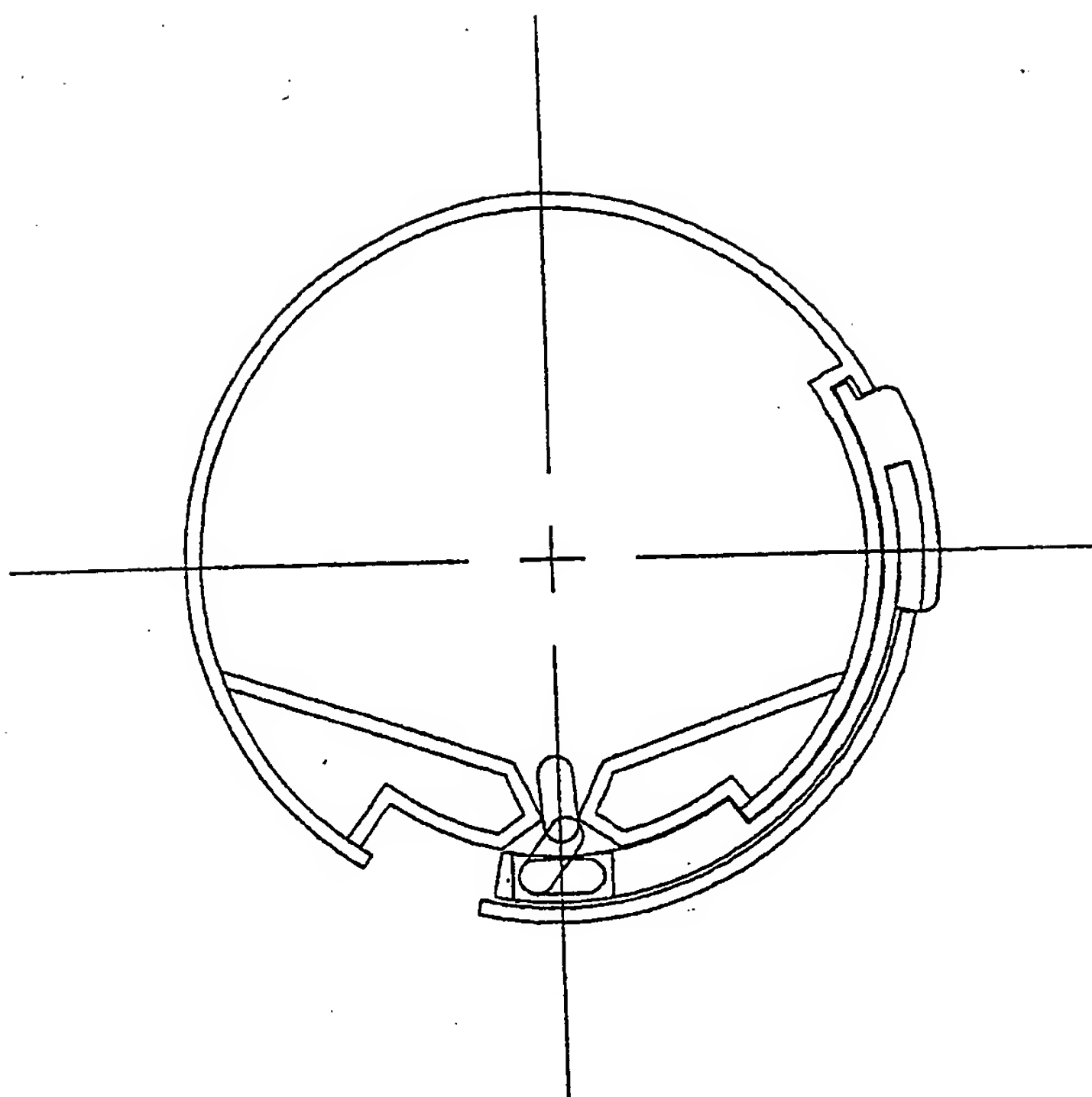


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/NO 00/00089

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61J 7/04

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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EPODOC, WPI

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9720537 A1 (DUMA INTERNATIONAL AB), 12 June 1997 (12.06.97), figures 1-9, claims 1-8 --	1
A	GB 2233795 A (LASERMAX CORPORATION), 16 January 1991 (16.01.91), claims 1-4 --	1
A	GB 2078682 A (BÜNDER GLAS/GMBH), 13 January 1982 (13.01.82), figures 1-4, claims 1-11 --	1
A	WO 9509386 A1 (APREX CORPORATION), 6 April 1995 (06.04.95), figures 1-4, claims 1-30 -----	1

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9720537 A1	12/06/97	AU 1046697 A SE 505802 C SE 9504336 A	27/06/97 13/10/97 02/06/97
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GB 2078682 A	13/01/82	BE 889476 A DE 8017768 U FR 2486034 A NL 8103094 A	03/11/81 30/10/80 08/01/82 01/02/82
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